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East Europe Report

SCIENTIFIC AFFAIRS

No. 728

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INFORMATION INDUSTRY FINDS NEW APPLICATIONS

Paris ZERO UN INFORMATIQUE HEBDO in French 16 Nov 81 p 16

[Article by FT: "A Hungarian Individual Computer"]

[Text] Presented last week at the Center for Information on Hungarian Technology, the HT 680x microcomputer offers interesting possibilities for digitization and graphics.

Specializing at first in video and television, the Hungarian Cooperative for Telecommunications (HTSz) perfected, one and one-half years ago, the HT 680x individual computer: a modular system built around Motorola's 6800 microprocessor. Its 32K main memory can be expanded to 512K with the addition of eight RAM boards.

An adapter makes it possible to connect the system to an ordinary tape recorder for a rate of 1200 to 2400 baud.

The alphanumeric viewing unit, located above the ASCII keyboard, displays 24 lines of 64 or 80 characters.

Several peripherals can be connected to the HT 680x. Among them are: two matrix printers of the type DZ M-180 or Daro 1156, an adapter for tape cassettes, a punched tape reader, a plotter, and a color graphics terminal.

Its operating system is the DC DOS, and it supports the V 24 and IEC 625 interfaces.

A compiler for BASIC should be completed within six months.

Microscopic Images

The major advantage of the HT 680x is its capability for recording and processing images.

The system is capable of introducing and storing in memory, images from a television camera, and of transmitting them from one monitor to another within 11 seconds. Four different photos can be reproduced on the same screen, and enlarged separately.

Placed directly on a microscope, the television camera can transfer to the system the image to be processed. This is intended primarily for biologic and medical applications (histologic sections, exact determination of blood samples), as well as for the physics of metals.

In the same way, the treatment of infrared images is used for medical diagnostics and industrial applications.

The Hungarian National Institute for Neurosurgery uses the HT 680x to analyze the spontaneous electronic activity of the brain and central nervous system, as well as electrical processes in muscles.

Most of the system's applications involve domains in which the treatment and handling of images are necessary: architecture, civil engineering, electronics, cartography, processing of satellite images, geology, oceanography, and so on.

The HT 680x is exported by Metrimpex, a Hungarian foreign trade company for instrumentation, which works with Sems, CII-HB, and Thomson-CSF.

In the EEC, it is distributed by Sertel (Company for Services in Teleinformatics and Telecommunications) at a price of 50,000 to 150,000 FF, depending on configuration.

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CSO: 3100/145

NEW COMPUTER DEVELOPED, DATA PROCESSING INDUSTRY GROWS

Paris ZERO UN INFORMATIQUE HEBDO in French 23 Nov 81 p 29

[Article by Bohdan O. Szuprowicz]

[Text] Because of the investments made during the 1970's, the value of the data processing inventory installed in Hungary multiplied eight-fold during the last decade, with an average annual growth of 26 percent; but the role played by Riad hardware from the Soviet block is decreasing steadily, as in the other East European countries.

At the end of 1979, Hungary had 1163 computers of all sizes, with a total value of about 800 million dollars, calculated at the official exchange rate for the Hungarian forint. This is obviously a very clear progress compared to the 127 systems--evaluated at 100 million dollars--which existed in 1970; but the present figures are well above worldwide ones.

Although the rate of introduction of information processing in Hungary has been relatively higher than that of the Soviet block during the last twenty years, it has still not succeeded in reaching that of countries outside the COMECON. And the number of installed computers per million inhabitants in Hungary is only 20 percent of that found in EEC countries.

Underutilized Systems

In 1979, Hungarian computers have supplied about two million machine hours, which amounts to an average of only 1700 hours per machine per year. This might lead us to think that two-shift utilization must not be very widespread in the country, but a report from the Hungarian Administration for Data Processing Applications indicates that in fact, the some 500 computers which represent the bulk of the installed computing power, operate with an average of two shifts per day; we must conclude that the systems which compose the remaining 60 percent of the computing power, are mostly underutilized.

Of the 1163 installed computers, only two are classed as large systems. Small computers represent 38 percent of that number, and intermediate ones 17 percent. The largest percentage is represented by miniprocessors and minicomputers, which amount to 44 percent of the total, and whose number is growing more rapidly than any other category.

Today, one of the largest machines in Hungary is an EC-1055 Riad system from East Germany, whereas this title once fell to western imports such as IBM 370/145, ICL 1904, and CDC 3300, who in turn had to share the distinction with the huge second generation Soviet Razdan-3.

Hungarian information processing employs more than 21,000 persons, among which there are nearly 1400 system analysts and 2700 programmers. The remaining are operators, maintenance personnel, and data preparation employees.

Industry First, Education Next

By far the largest amount of machine time is used, as elsewhere in Europe, for traditional tasks; inventory control and resource allocation applications follow far behind; and software development, production control, process control, and scientific calculations, each occupy an equal proportion of machine time. Training involves only 3.2 percent of this time, but since the machines are underutilized, this time could clearly be increased if necessary.

Nearly one-third of the computers work in industry, but a sizeable one-fourth are installed in educational organs which provide services for various organizations. At least 20 machines, for instance, operate in different units of the Minstry of Education alone.

This situation results from the fact that educational organs were the first to install and use computers, at a time when the necessary training was not very widespread.

This dependency of information processing on academia is becoming perennial. Public administration, health, and other public services follow in third position.

Domestic and foreign trade enterprises, as well as transportation and communications for industry and construction, each use at least 10 percent of Hungary's computers. Forestry and agriculture are the sectors of the economy least involved in data processing.

Soon, a National Network

The Central Office for Statistics controls the National Organization for Accounting and Electronic Data Processing (SZUV), which manages information processing centers in Budapest and at 13 regional bureaus; by 1985, it plans to extend this service to 19 centers throughout the country. It is the largest organ of information services in the country, with over 800 employees and a gross business of about 40 million dollars per year. SZUV started in 1960 with a Univac 1004, and in 1966 imported an ICL 1904, at the time the largest system in Hungary.

The trend in recent years has been to install Riad machines, which replace the old western imports and the Polish Odras. Thirty Riad computers are already in service, most of them EC-1002 and EC-1020. Very few machines operate in time sharing, and batch processing is the rule, but SZUV plans to eventually interconnect all its centers into a national network.

Szamok, the National Center for Management Planning, is responsible for basic data processing training, and today places emphasis on small computers: EC-1010, EC-1020, EC-1022, EC-1030, EC-1032, Hungarian designed TPA minicomputers, and a unified series of SM computers manufactured in Russia.

Szamok publishes two periodicals in the field, SZAMITASTECHNIKA and INFORMACIO-ELEKTRONIKA, which keep the Hungarian data processing community informed of the latest technologic progress.

Role of Institutes

Several technical institutes are developing material and software for industry, and cooperate with the COMECON Riad program.

Among the hardware we find Hungarian TPA minis, EC-1010 and EC-1050 Riad computers, CRT terminals, and the graphic terminal GD 71, which was developed in Hungary after the exportation of a similar terminal from the United States was refused a few years ago.

In terms of software, the institutes have perfected a COBOL compiler and most of the operating systems of their computers. A national information processing organ, Noto, takes care of maintenance, spare parts, and service for all of Hungary's computers, including western imports, whose number is rapidly decreasing.

Thus, if the Hungarian information processing industry is relatively well organized, and if its progress can be considered satisfactory with respect to the goals and achievements of the 1960's and early 1970's, it is nevertheless from now on, resolutely turned toward the east.

11,023
CSO: 3100/145

DECREE REGULATING BUDGETED RESEARCH SITES EXPLAINED

Budapest FIGYELO in Hungarian 2 Dec 81 p 5

[Article by Dr Zsolt Aradi: "Financial Management of Budget-Financed Research Sites"]

[Text] A recently promulgated decree of the minister of finance regulates as of 1 January 1982 the financial management and incentive system of budget-financed research sites (research institutes, and also universities, colleges and numerous other institutions that perform research not as their exclusive basic activity but as a sideline). The new statutory provisions affect not only research sites, but also other state-controlled managing (or coordinating) organizations that commission research work for the state, and enterprises that maintain contractual relations or partnerships with research sites.

Uniform Consideration, Classification

In the course of evaluating the realization of the MSZMP Central Committee's Science-Policy Directives, specific provisions of financial regulation also were justifiably criticized. A summary evaluation of this kind states, for example: "The present system of financing and financial management has created different self-interest relationships at the independent research institutes that function as enterprises or are budget-financed, and at university research sites. In some areas the system does not provide proper orientation. It does not stimulate adequately concentration on preferential topics, while in other instances it provides too much incentive for services and production." The critique has clearly demonstrated that the incentive system of the different types of research sites must be streamlined, continuously and in a coordinated manner. This task had to be solved also in the course of elaborating the new system of financial management for budgetary organs.

Drafting of the new statutory provisions was preceded by an extensive survey of the existing situation, and the obligations are laid down in cabinet-level documents. In spite of this, the considerations of science policy, research management and financial regulation could be asserted only after much debate, and in some instances merely on the basis of compromises. With the promulgation of the decree, the same basic statutory provisions apply to the financial management of every type of budget-financed research site (i.e., to research institutes, universities, etc.) and to research commissioned by the state. This permits the application of a uniform system of criteria, to the extent that this is warranted. In principle, then, the provisions differentiate not by types of research site, but by tasks.

Regulation that influences development of the research sites' specific (research and other research-related) activities necessitated the clarification and definition of certain research-management concepts and regulations. For example, redefinition of the concept and scope of basic activity, and of work outside such activity, conveys the fact that "contractual work" actually corresponds to a practice of financing under which the research-managing organization or customer specifies in writing the research task, but this task does not necessarily provide a profit. Clarification of the role that "controlled" research plays in the life of budget-financed research sites likewise became an urgent task.

The statutory provisions rank the research sites' individual activities in the order of their importance. The most valuable activities are: commercialization of research results, transfer of research results for commercialization, contractual research for the applying production organization under which the profit and risk are shared, and tasks included in programs of special importance. This classification is very important, because also the system of material incentives is linked to it. Preferences may be assigned if research-management decisions unambiguously attribute special importance to the activities, to the extent that this is sound also on the basis of socioeconomic considerations.

Research Commissioned by the State

The decree regulates research commissioned by the state. It defines the circle of tasks for which a commission from the state is required, and which must be given priority. These are: tasks of the OKKFT [Orszagos Kozponti Kutatas es Fejlesztesi Terv; National Central R & D Plan], research tasks of the branch, etc. target programs, and a few tasks at the ministry level. Since construction of a new system was involved, many details also had to be regulated. Thus the statutory provisions define the circle of organizations that may commission research (for example, the program bureaus), the content of the commission, the relationship between the general contractor and subcontractors, the coordination of professional evaluation and financial accounting, and numerous questions of financial settlement. The state commissions research tasks of special national importance, and therefore the provisions regarding the organization of research are supplemented also by incentives. In the case of research whose incentives are linked to the unspent balance (in the social sciences, for example) this provides an opportunity to grant additional bonuses, over and above the budgetary allotment for bonuses. In the case of research to which the profit incentive applies (for example, technical or agricultural research), realization of a specified profit is the source for material incentives. Since research commissions from the state cover a period of several years, the financial, personnel, etc. conditions of fulfillment are specified for the given period, and provisions had to be made also for annual incentives. As a result, research is expected to be better organized, its fulfillment will be simplified, and --highly desirable--the costs and incentives will be linked more closely to the actual results of research and development.

The purpose of defining the conditions under which research sites may undertake, from customers other than the state, research that is outside the scope of their basic activity is to "protect" the basic tasks (for which the institution was established), respectively the institution's budget. The priority of the preferential R & D tasks does not mean that fulfillment of the enterprises' everyday needs must be cut back completely. However, research capacity must be utilized more efficiently than up to now, and therefore the regulators must stimulate development of more expedient proportions.

Profit Incentive

An important part of overall regulation is regulation of the profit incentive, i.e., the formulation of rules according to which the research sites manage their profit. Profit may originate from the proceeds of many different activities. For example, contractual research performed for enterprises, commercialization of research results, or other production-related research commissioned by the state. Such research may be financed from various resources, including also budgetary subsidies. This serves to provide more material incentive and simplify regulation. The differences between the proceeds and costs are consolidated (annually) for the institution as a whole and may include also losses on individual research projects. (Within the framework of its internal incentive system, of course, the institution may employ profit-and-loss accounting by projects and direct incentives, but this must be solved within the institution's own rules.)

Under the profit-incentive system the uniform level of criteria manifests itself in that the price forms applicable to the individual types of budget-financed research sites, their principal normative cost items, the principles of cost accounting, the method of determining profit, the forms and rates of sharing profit with the state budget, and the modes of allocating and spending profit are identical. All this serves to approximate the regulations applicable to the research sites that function as enterprises, while avoiding unwarranted standardization.

Under the uniform system, only one distinction is made between the different types of research site: in view of the fact that the so-called other research institutions (for example, the universities) perform also educational, medical, etc. basic tasks and offer a level of personal incomes generally higher than at research institutes (this difference had to be preserved), pay for research performed in addition to regular duties is not affected by profit regulation.

An essential consideration in the changeover to the new system is that the average level of personnel incomes must not decline. It is estimated that this requirement will be met through minor shifts in the average level of personnel incomes between institutions, in the warranted direction (assuming that all other external factors remain unchanged). Total transfers of revenue to the central government will not increase in relative terms. The decree of the minister of finance does not set absolute limits on personal income--neither on the amount payable per person, nor on the total bonuses per institution.

Reflecting the government's science-policy efforts, the regulation simultaneously sets differentiated conditions as well. Material self-interest must differ in accordance with what type of activity (preferential or other) the institution conducts. This is ensured through transfers of revenue to the supervising organs (these transfers may differ by types of research tasks), and through the so-called indirect incentives. These indirect incentives include the provision that the allocation of the institution's profit favors personal incentives (the profit-sharing fund) if the research site conducts a larger proportion of activity that is more valuable from the viewpoint of science policy. The tax benefits that may be granted in taxing the profit-sharing fund are based on the same principle. From all this it follows that the incentive funds can be greater than at present if the research site accepts research tasks with due consideration for their importance from the viewpoint of science policy. Within the framework of the profit incentive it is also possible to provide some recognition of basic research.

Role of Regulation

Even this brief outline conveys the statutory provisions' topical diversity, and also the efforts to streamline the structure of the research sites' activity under a uniform system of requirements and differentiated incentives (so as to increase the proportion of research that is of special importance and of proven economic value), and to make efficiency the primary consideration when choosing research sites for the research tasks.

The decree of the minister of finance sets the most important conditions for meeting the specified requirements. It does not formulate a detailed solution for every problem and task, because it cannot take into consideration all the peculiarities of each sicence, type of research site, and supervising organ; the diversity of the research endeavors rules this out. For this reason the realization of science policy, the efficient use of the available conditions, the functioning of the research sites and scientific research within a uniform regulatory framework will depend to a significant extent on the ministries that issue more detailed regulations, on the managers of research and--last but not least--on the researchers themselves.

1014
CSO: 2502/32

CHEMISTRY HUNGARY

UDC: 661.12.013.8[628.54].014.062.612.12.048

REMOVAL OF SOLVENT FROM WASTEWATERS OF THE PHARMACEUTICALS INDUSTRY BY MEANS OF DISTILLATION

Budapest MAGYAR KEMIKUSOK LAPJA in Hungarian Vol 36 No 7, 1981 pp 370-374
manuscript received 24 Mar 80

MARTON, GYULA; Mrs. DENCS, BELA; SZOKONYA, LASZLO; and DUALSZKY, SANDOR,
Kobanya Pharmaceuticals Works, Budapest

[Abstract] Laboratory tests were carried out to establish the equilibrium conditions between liquid and vapor in water/ethylene acetate mixtures. It was found that the relative volatility of the ethyl acetate is very high at concentrations of more than approximately 0.1 percent by weight. Condensation of the vapor yields a two-phase liquid system which separates according to the mutual solubilities. On the basis of the results of these tests, studies were carried out with batchwise and continuous disctillation systems to develop a suitable procedure for the removal of a solvent such as ethyl acetate from solvent-containing wastewaters. In neither test series did the usually encountered other contaminants interfere with the solvent removal. In the technological system, featuring continuous distillation, the solution is preheated (to about 333°K) and heated in the distillation system to about 373°K, at which temperature most of the ethyl acetate evaporates. The condensate is then phase-separated. The solvent phase contains very little water. The aqueous phase is fed back to the inlet. The distillation column is designed in such a manner that the residual solvent can be fully recovered. An experimental system was operated to obtain experience with its performance under plant conditions. It was confirmed that the system is efficient, technologically feasible, and economical. Preliminary tests were carried out to evaluate the suitability of the method for other solvents such as 1,2-dichloroethane and methyl isobutyl ketone. Figures 5, tables 2, no references.

2542
CSO: 2502

UDC: 665.6/.7.013::621.643.039.006.8:519.246.2::519.876.5

STOCHASTIC ANALYSIS OF THE INTEGRATION OF ETHYLENE STORAGE FACILITIES

Budapest MAGYAR KEMIKUSOK LAPJA in Hungarian Vol 36 No 7, 1981 pp 346-348
manuscript received 4 Mar 80

MANHALTER, PETER; and TABOR, ISTVAN, Association of Computer-Technology Development in the Chemical Industry, Budapest

[Abstract] The optimization of ethylene reservoirs connected with a pipeline system was investigated. Use was made of the theory of Markovian chains for the formulation of the task in terms of a mass-service problem. The aim was the determination of the optimum tank-farm size and the economic advantages of constructing the pipeline connecting the individual tanks located at sites where the ethylene is produced and used. The storage system features buffer tanks into which ethylene is fed whenever the user facility obtains an excess and from which ethylene is withdrawn whenever the user facility shows a deficiency. The principle of "accumulated stock" was introduced for the processing of the status data coming from the various sensor locations. Operating data from ethylene production and utilization facilities were collected to establish the relationships required for the designing of the optimum system. For practical use, it is then necessary to know the total capacity of the tank farm and the magnitude of the starting stock. The results of the analysis were applied to a proposed facility. It was established that optimization by means of the method developed is feasible. The main procedure of the method involves the simulation of the temporal course of the ethylene balance. This is accomplished with the aid of a random-number generator and the Monte Carlo method, using the queue theory. The method does not unify the parameters for repair-time distribution nor for operating times. Nonetheless, the stochastic character of the processes involved justifies the approach employed. Figure 1, 2 Hungarian references.

2542
CSO: 2502

UDC: 665.7[665.668.1](439):658.628.011.1

DEVELOPMENT OF THE LIGHT-PRODUCT SYSTEM AT DANUBE PETROLEUM-INDUSTRY ENTERPRISE

Budapest MAGYAR KEMIKUSOK LAPJA in Hungarian Vol 36 No 7, 1981 pp 343-345
manuscript received 6 Mar 80

RATOSI, ERNO; PERGER, JOZSEF; and WAPPEL, LASZLO, Danube Petroleum-Industry Enterprise, Szazhalombatta

[Abstract] The enterprise is expected to process approximately seven million tons of petroleum per annum in the foreseeable future. About 55.7 percent of the production represents light products, defined as gasoline, light oil, gas oil, and products derived from these such as aromatic compounds and their derivatives. Among the light products, gasoline and liquefied gas accounts for 19.7 percent. It is considered that the percentage of aromatics could be increased, and that it would even be possible to increase the percentage of all light products. This would be desirable since especially the aromatics could be sold at higher profits, and marketed in capitalist areas. A plan was therefore developed for the implementation of an improved light-product system. The plan considers the required investments, sale possibilities, domestic needs, and staff resources. Emphasis is placed on the production of more jet-engine fuel and aromatic compounds, and on the introduction of new products. Only minor plant conversion would be required for increasing jet-fuel manufacture, and since the domestic demand for this fuel is expected to increase, the required investment would pay for itself soon, especially in view of the fact that increasing amounts of jet fuel are now imported. The amount of investment required for increasing the production of aromatic compounds is higher; however, it is considered that the increased capacity (especially the production of more xylene, n-hexane, and high-octane additives) is desirable. In order to increase the total light-product yield, it would be necessary to implement fluid catalytic cracking technology. Full implementation would increase the yield of light products to 68.1 percent of the total production. Figures 2, no references.

2542
CSO: 2542

UDC: 665.6/.7.013(439):658.628.011.1

EXPANSION OF THE PRODUCT LINE OF PETROCHEMICAL COMBINES

Budapest MAGYAR KEMIKUSOK LAPJA in Hungarian Vol 36 No 7, 1981 pp 339-342
manuscript received 24 Mar 80

KOVACS, ISTVAN, Borsod Chemical Combine, Kazinbarcika

[Abstract] During the 1960's, one of the two Hungarian chemical combines (Borsod Chemical Combine [BVK] and Tisza Chemical Combine [TVK]) started to specialize for the production of polyvinyl chloride and the other for polyethylene. BVK produced acetylene by the oxidation of natural gas, and TVK produced olefin products by gasoline pyrolysis. TVK started producing ethylene during 1975 in a new facility for the manufacture of polyethylene and for supplying the Soviet vinyl chloride plant in Kalus. The latter plant supplied polyethylene and other chemical products in exchange. TVK also uses part of the ethylene production for polypropylene manufacture. Both chemical combines are considering further expansion of their product lines. The following possibilities appear to be economically desirable for BVK: (1) Production of phosgene derivatives from the 50,000-60,000 tons of carbon monoxide that can be manufactured; (2) Production of nitrobenzene from the nitric acid excess and benzene (the nitrobenzene could be reduced with the hydrogen available to aniline); (3) Production of MDI [expansion unknown] from aniline and phosgen for polyurethane manufacture; (4) Production of aliphatic amines, diamines, and dimethylformamide from part of the carbon monoxide and ammonia excess; and (5) Producing intermediates for pesticide and pharmaceuticals manufacture from aromatic amines and isocyanates. These plans, when implemented, would produce materials that can be profitably exported, would utilize byproducts which are presently not used economically, would permit more efficient factory operations, and would make it possible to produce chemicals which are presently imported. Another important result of the planned expansions would be the fact that the investment-intensiveness of BVK's production could be decreased by a factor of 2.6. In addition, the annual profit would increase 4.9-fold with a staff increase of 13 percent. Implementation of the plans would require an increase in the fixed investments of the combine by 87 percent. Figures 2, table 1, no references.

2542
CSO: 2502

NITROGEN FIXATION IN A PROTONIC MEDIUM. BIOLOGICAL NITROGEN FIXATION AND ITS CHEMICAL ANALOGS

Budapest KEMIAI KOZLEMENYEK in Hungarian Vol 55 No 1-2, 13 Jul 81
pp 13-37 manuscript received 26 Oct 79

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[Abstract] This article, the text of the author's paper delivered at a meeting of the Coordination Chemistry Group of the Hungarian Academy of Sciences, is an updated version of the relevant portion of the book entitled "Biological Aspects of Inorganic Chemistry," edited by D. Dolphin, published in 1977 by J. Wiley and Sons, New York. Theoretical considerations (possibility of the one-step multielectron reduction of nitrogen and intermediate products of the reduction of nitrogen in a protonic medium) and nitrogen-fixing systems in a protonic medium (nitrogen gas, reduction in the presence of trivalent titanium and molybdenum, and bivalent chromium and vanadium hydroxide; amalgams of the alkali metals as reducing agents; the electrochemical reduction of nitrogen; the vanadium and magnesium hydroxide systems; the complexes formed between bivalent vanadium and pyrocatechol or its related compounds; and other nitrogen-reduction systems in protonic media and the Schrauzer nitrogen-gas model) are discussed. In all known cases, the reaction takes place in the coordination sphere of the catalyst complex, without the intermediate formation of N_2H or N_2H_2, and in most cases of free hydrazine. Direct reduction to ammonia was also possible in some systems from nitrogen gas. Various conditions must coexist for successful reaction. For example, reduction of nitrogen may be expected in the complexes of d^3 and d^4 transitional metals, particularly trivalent molybdenum and bivalent vanadium. The oxidation-reduction potential of the reducing agent must be high, probably higher than of the $N_2 + 2e^- + 4H^+ \rightarrow N_2H_2$ system. Favorable catalyst complex systems are described and it is concluded that, in general, multinuclear systems are most favorable for the reduction of nitrogen. Figures 7, tables 3, references 75: 2 German, 38 Russian, and 35 Western.

2542
CSO: 2502

MATTERS CONCERNING PROTEIN SUPPLY; NEW PROTEIN SOURCES

Budapest KEMIAI KOZLEMENYEK in Hungarian Vol 55 No 1-2, 13 Jul 81, pp 163-177, manuscript received 17 Jan 80

LASZTITY, RADOMIR, Dr of chemical sciences, Department of Biochemistry and Food Technology, Budapest Technical University

[Abstract] In his lecture delivered at the Food-Protein Conference of the Hungarian Academy of Sciences, held in Balatonfured on 10 May 79, the author discussed the present status of the world protein supply, means for increasing the protein production from currently available sources, and the prospects of potential new protein sources. At the present time, approximately 70 percent of all protein produced is of vegetable origin and the rest of animal origin. It is possible to increase the production of protein from grains such as wheat, maize, and barley (but not of rye) two to three fold by the end of the century. Other major sources of vegetable protein are soybeans, other oilseeds, vegetables, and leaves. Appropriate improvements in growing, harvesting, storage, and processing could result in major increases in protein production from these. Unicellular protein sources (algae, yeasts, and certain bacteria) represent a relatively recent development. Once the toxicological and hygienic problems are resolved, they represent a major future protein source. The same applies to microbial protein types made on a methanol basis. It is expected that proteins of vegetable origin will continue to predominate in the next 10-15 years. However, over the long range, unicellular proteins are expected to play a major role. Initially they are likely to be used mostly for animal feeding, and in a next step by countries without adequate soybean and fishmeal resources. Cost factors, presently still uncertain, will play a major role in the development of these protein sources. In the very distant future, biochemical reactors in which nuclear or fusion power is used for creating proteins in a systematic manner may be developed. Figures 2, tables 11, references 12: 5 German, 3 Hungarian, and 4 Western.

2542
CSO: 2502

UDC: 681.32.06.001.4

SELF-TESTING OF HIGH-SPEED DIGITAL EQUIPMENT

Budapest MERES ES AUTOMATIKA in Hungarian Vol 29 No 10, 1981, pp 372-379
manuscript received 21 May 81

SZENCZI, ARPAD, and SZEPHEGYI, ATTILA, Department of Electronic Metrology, Research Institute of the Communications-Technological Industry, Budapest

[Abstract] The author discusses self-testing of high-speed digital equipment on the basis of functional tests (for example, in a general-purpose processor, the following functional groups may be used: data storage, data transfer, register selection, command decoding, execution of arithmetic or logical operations, and control functions) and describes the algoritmic signal-pattern generator (this high-speed unit generates the algorithmable patterns required for the testing of LSI memories, meaning the generation of the following signal categories: control of the memory tested, addressing the memory tested, supplying data to the memory tested, and readout of the data from the memory). Three application examples are presented: testing program for the control memory, testing data transfer combined with incrementation, and testing a subtraction. Although only limited means are available for the detection of faults in self-testing, the faults can be generally localized at a high degree of accuracy under real-life conditions. Self-testing will become increasingly important as the complexity and the number of components in systems increases. Development of hardware test programs -- which presently lags behind -- will significantly improve the effectiveness of the testing. Further studies are required, however, before such programs could be prepared. The trend is toward the development of special diagnostic systems which indicate simple faults, localize the faults, and in some cases correct the faults. Figures 6, tables 2, references 6: 1 Hungarian and 5 Western.

2542
CSO: 2502

UDC: 681.3.06.001.23:681.326.7

DESIGNING PROM/EPROM MICROPROCESSOR PROGRAMMING DEVICES

Budapest MERES ES AUTOMATIKA in Hungarian Vol 29 No 10, 1981, pp 380-384
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[Abstract] This article describes a suitable command set for programmers on the basis of the PROM program, developed at the authors' institute. It is assumed that the program operates under an operating system that performs memory listing and modification so that the programming software does not require these functions, and merely entry and departure from the program is needed, meaning that there is no need for listing the memory area, modifying the memory area, and connection to external computer or perforated tape reader. The commands include V (verify), R (read), C (combine), E (empty), T (test), W (write), J (jump), X (exit), Y (copy), S (signature, check sum), M (mask), I (invert), H (higher four bits), O (over four bits), and N (normal mode), plus optionally Q (read), Z (write), L (load), and P (patch). Means to eliminate operator errors are provided. The MMT system features the programming device supplementing the existing microprocessor with a periphery card performing special functions and attached modules. The developing device DT-80 forming part of the MMT system has a bus system of which the definition is the same as that of the user bus system, so that the PRO card can be either that of the developing system or that of the user. In the present version, all commands except copying, S, M, I, and N can be realized. The program, including the tables, is shorter than 4 kbyte. It can be presently used to write the following PROM/EPROM types or their equivalents: EPR modules, UPI modules, SPR modules, and TPR modules. References 11: 2 German, 3 Hungarian, 1 Russian, and 5 Western.

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ACOUSTIC EMISSION RESEARCH AT THE CENTRAL PHYSICS RESEARCH INSTITUTE OF THE HUNGARIAN ACADEMY OF SCIENCES

Budapest MERES ES AUTOMATIKA in Hungarian Vol 29 No 10, 1981, pp 392-395
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[Abstract] Acoustic-emission measurements and acoustic-emission instrumentation carried out or developed at the authors' institute are described. Among the acoustic-emission measurements, those aimed at the determination of the fracture mechanism and stress corrosion of steels, and the fracture mechanism of rock samples deserve special mention. In the stress-corrosion measurements, the fork-shaped test sample is subjected to mechanical stress under thermal loading and exposure to corrosive agents. The fractures that develop and propagate generate acoustic emission signals which are continuously recorded. Measurements were also carried out with the sample under tensile testing. In the rock (primarily marble) samples, studies were also carried out with the aim of forecasting future fractures. The Kaiser effect (acoustic activation of a sample reoccurs only if the stress exceeds the maximum of earlier tests) was also investigated. The method was found useful for establishing whether the stress in a rock sample stabilizes after a period and for determining the maximum stress to which the sample had been subjected before. A four-channel acoustic-emission analyzer (NEZ 210) was developed. It detects the acoustic-emission events, counts the events, and totalizes the oscillation parameters for each channel. The results are displayed on seven-segment LED display, X-Y plotter, and digital character printer. The measuring and signal-conditioning units of the instrument are constructed in the internationally standardized NIM nuclear-instrument module system. A level accommodates four modules, connected via an NIM bus system made up of the standard computer data bus as well as additional digital and analog connections. Figures 5, references 11: 1 German, 2 Hungarian, and 8 Western.

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TESTING THE TYPE KFT 8080 MICROPROCESSOR WITH THE ICOMAT-110 MEASURING EQUIPMENT

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[Abstract] In the ICOMAT-110 measuring system, developed at the Research Institute of the Communications-Technological Industry, the test vector series for the diagnostic procedure (indicating faults as well as their causes) are derived in part from algorithm and in part from stored patterns. It has an algorithm signal-pattern generator with a high-speed data-buffer memory. The system consists of a specially designed, multiprogrammed, high-speed processor that generates the algorithmic pattern, and of an equally high-speed data-buffer memory. The circuit to be tested is adapted to the signal-pattern generator via a type card. The assembly, consisting of the ICOMAT-110, the type card, and the wafer-measuring unit, is capable of testing the operation of the microprocessor under the least favorable supply, drive, and timing conditions. Generation of the input and output pattern, changing the timing, and selecting of the tested outputs is accomplished by means of the ICOMAT-110 control program. The following program modules are available: PC test, ALU interference-resistance measurement, internal bus test, test of ALU + combinatory logic, switching-adding-subtracting unit test, and internal memory test. Measurements were made with the above hardware and software on microprocessors from current production. The results indicated that faults could be diagnosed and their causes determined. Figures 7, references 10: 6 Hungarian and 4 Western.

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LINKAGE OF SCIENCE AND INDUSTRY PROPOSED

Warsaw TRYBUNA LUDU in Polish 2 Dec 81 p 3

[Article by Tomasz Miecik: "How to Link Science With Industry. Proposals of the Gliwice Community"]

[Text] Within the scientific community and society at large there prevails a profound belief according to which the areas of science and technology should undergo change. The scientific community itself has, of course, the most to say on this topic, and drafts for the most appropriate solutions can evolve within it.

It is notable that many proposals for changes in the scientific-technical support base originate within the party's organizational units or in party teams operating in the scientific community. We have presented many such drafts, including those developed by the party organization of the Polish Academy of Science and the Main School For Planning and Statistics. Aside from issues specific to this community, these documents, let us note, focussed on the role and function of science in society and the development of safeguards to prevent retreat to an instrumental approach to science.

Studies are currently underway to determine the position of the scientific technical support base within a reformed economy and linkages of future developmental mechanisms with technological progress. Among these studies, a particular position is occupied by the proposals drafted by the Gliwice scientific and technological community, one of Poland's major clusters of industrial institutes, design offices, colleges and PAN institutes with considerable expertise in scientific and industrial cooperation. This subject is being discussed for the most part in the forum of the party's Commission For Affairs of Ministerial Institutes. The commission is consultative and advisory in character and its mission is to bring about effective utilization of the potential concentrated within the industrial and agricultural scientific-technical support base under a reformed economic system.

One of the earliest studies of this team is a detailed organizational analysis of what is termed a scientific-productional complex and the principles under which work is coordinated in research centers. The authors' point of departure is that science, technology and production practices constitute an inseparable whole. Accordingly, prior to issuing legal directives and normative standards for the particular segments of the scientific-productional complex, a coherent view must be determined for the functioning of this complex in its entirety. What the authors label the scientific-productional complex are enterprises and institutions that collaborate on the processing and utilization of scientific knowledge.

Included in the complex are universities which, according to the draft, should become responsible for training engineers and a scientific research force. These include PAN centers that conduct basic and developmental research which create an indispensable reservoir of theories and scientific concepts for possible use in technological advances, (ministerial) industrial research institutes responsible for technology levels in specified areas of economic activity, design offices which ensure quality control solutions for investment preparation, technical and structural design service branches and subunits for technological progress within those plants charged with application of modern technology; research and development centers responsible for up-to-date products especially in those industrial branches that require a rapid response to changing trends; factory research labs primarily charged with the supervision and direction course of complex technological processes; units handling technological, scientific and economic information to develop problem-targeted technical and economic analyses and organizational expert assessments and patent studies.

Efficient operation of this complex requires integration of all of its components. For this purpose, individual institutions assign portions of their total potential for work jointly with those components with which they are collaborating. For example, certain higher educational establishments conduct some work in industry, industrial research institutes can create small design units and conduct fundamental research within certain limits, design offices can operate systems for scientific, technical and economic information and can perform project studies and forecasting work. This solution introduces an element of competition, favorably affecting the quality and effectiveness of work.

The importance of technological and economic progress to restore the country's potential, the advantages of specialization and co-production along with the intensifying signs of conflicts of interests are believed by the authors' of the study to require the establishment of a strong center for coordination of scientific-technical activity in the country. At the same time, this center must be organized so as to preclude the danger of arbitrary styles in the management of the science-production complex. This type of center received the name of KPNT [Committee For Scientific and Technological Progress] and principles for its operation were developed.

The tasks of the management center would include, among other things, the generation, implementation and coordination of actions for the sake of scientific-technological progress in the production sector and in health care, allocation of budgetary resources earmarked in central programs for research and development and application. The committee would periodically submit to the Sejm of People's Poland all data needed for realistic planning to satisfy the nation's material goods and health protection needs. The parliament, in turn, would transmit to the center the standards for compromise and priorities to be applied in the planning and would appropriate resources to implement central programs. The KNPT tasks would also include the protection of national interests involved in scientific-technological progress (protecting creative persons, natural environment, domestic technological concepts, and industrial property, among other things).

The foremost duty for KNPT would be to analyze the domestic state of engineering techniques and technology in comparison with world achievements and to transmit its conclusions to the government. Analyses and reports on the condition of the national economy in regard to utilization of technological progress would form input in the development of socioeconomic plans for the country. The government, in turn, would supply the committee with data on external conditionings of the operation of the science-production complex, such as financial possibilities, foreign trade outlook and the state of national and world economy.

On this basis, the committee would undertake incentive and coordinating actions. It is envisaged that the management center would have the right to exercise its own initiative to form new research units and delimit their scope of operation, conduct personnel policies in scientific technical facilities, along with the right of legislative initiative in the entire sphere of scientific-technological progress. The committee would also format a system for financing research and technical work and application.

Through their scientific councils, the institutes would transmit to the center their offers to do projects which failed to secure direct orders from the industrial sector. The center would then balance the needs with financial possibilities and would contract with institutes to perform selected projects, allotting, at the same time, resources from the central budget for their completion.

In keeping with the concept discussed here, the committee would base its operation on collective, interdisciplinary, and specialized knowledge of a fairly large group of experts selected by particular components of the science-production complex. In order to avoid arbitrary decisions, the authors of this concept propose that the KNPT be composed of a State Council For Scientific-Technological Progress, appointed by the chairman of the council of ministers, and a Self-governing Council of the Scientific-Technological Support Base--an autonomous body operating on the strength of a separate charter.

These, in capsule form, are the proposals of the Gliwice scientific community presented more extensively in TRYBUNA ROBOTNICZA of 10 November 1981. As mentioned earlier, other proposals of this kind are evolving in the scientific community's party organizations operating there. We will present them, recognizing the fact that they are geared toward the implementation of the resolution of the Ninth PZPR Congress requiring party organizations to "constructively transform higher education and scientific communities, bring down the barriers between sections of science, and integrate science and scholars around jointly determined cognitive and social goals."

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